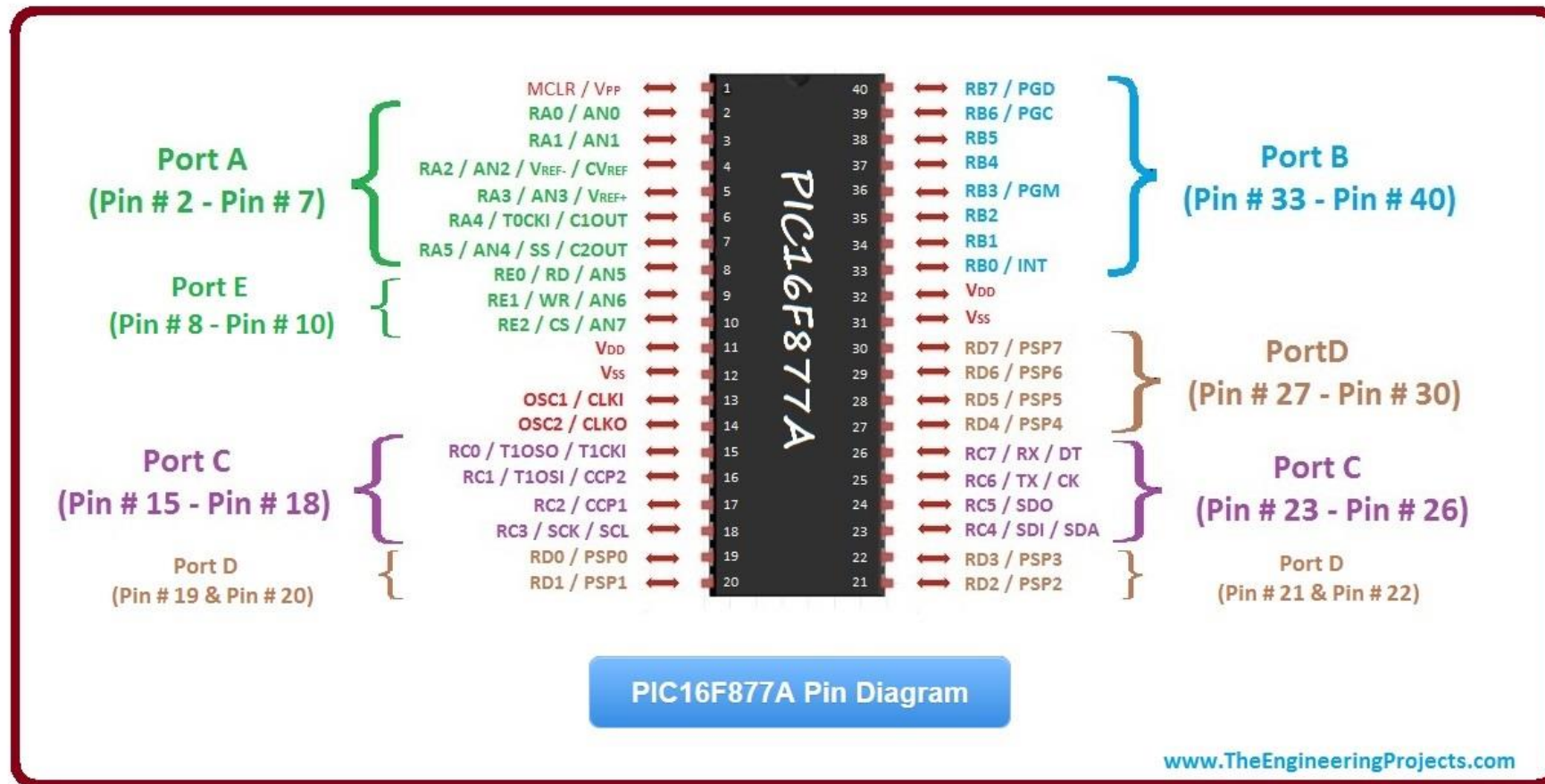


MEE427

Microcontroller Overview

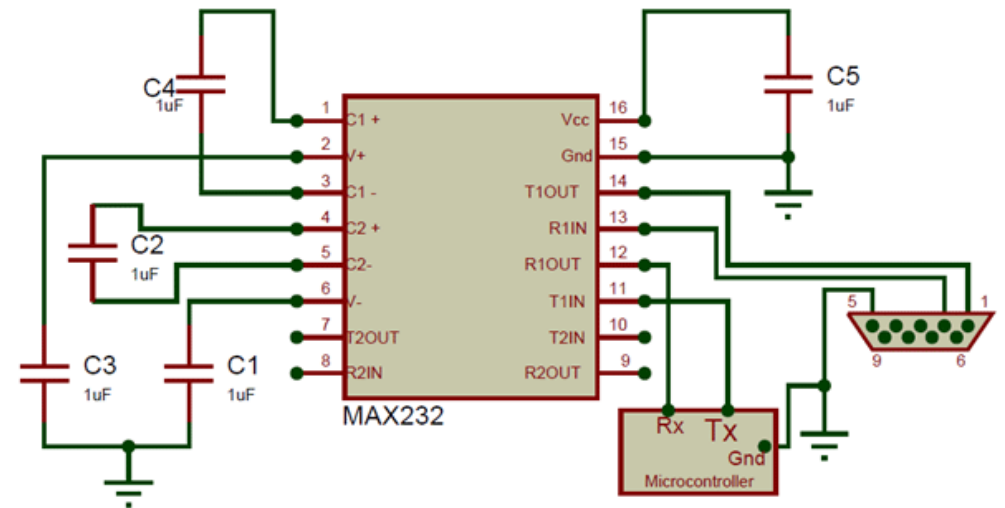
02/11/2023

PIC 16F877A



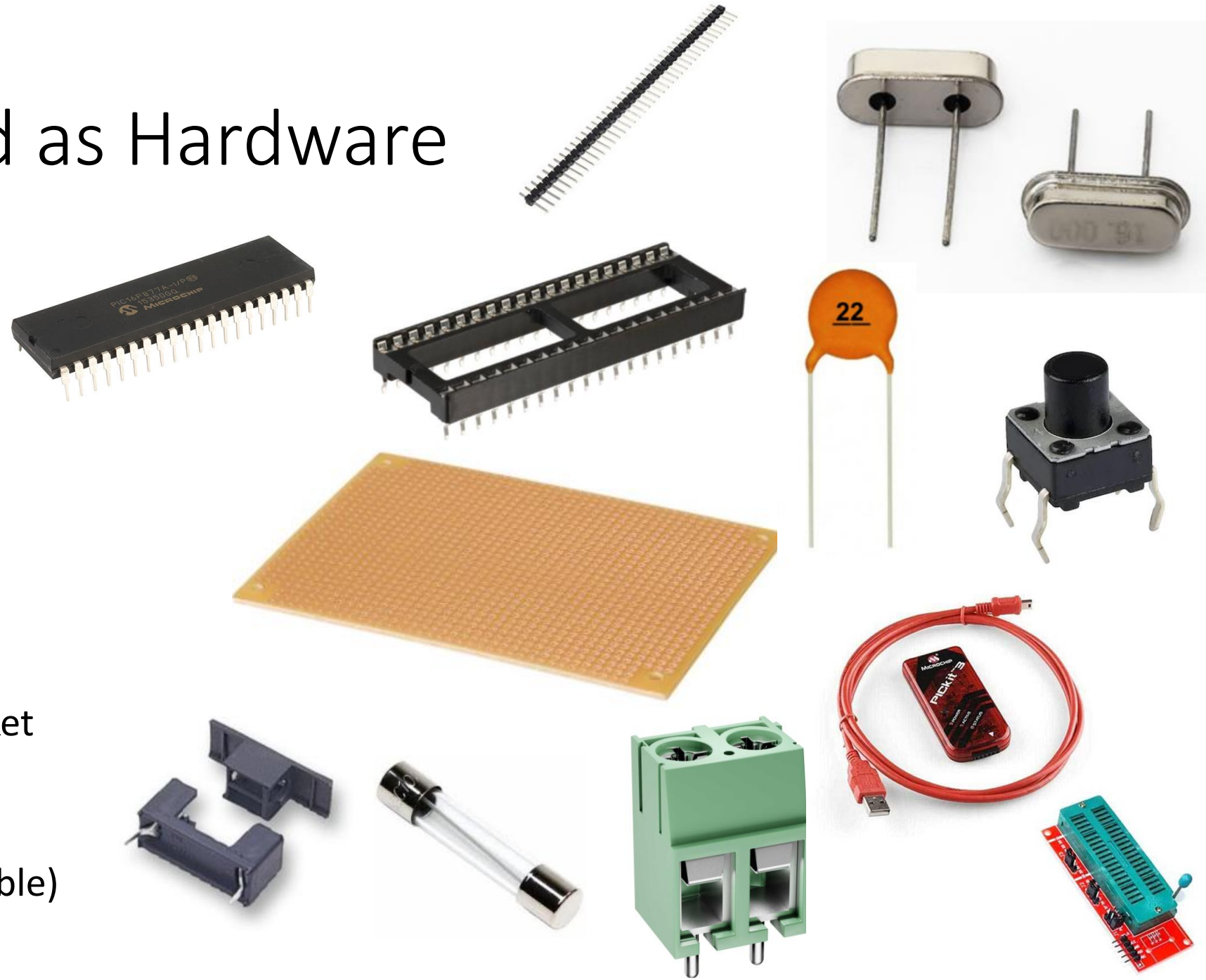
Components and Software

- Needed Hardware;
 - PIC 16F877A
 - PIC Programmer (available)
 - Crystal and capacitors
 - Max232 and rs232 to usb converter or FTDI Cable or Arduino Uno without chip (needed for debugging)



What needed as Hardware

- PIC16F877A
- 40 Pin Socket
- Crystal 20MHz
- 22 pF Capacitor (x2)
- Perforated Board
- 40 pin male header
- 10k Ω Potentiometer
- 1 Tach Button
- 10k Resistor
- Fuse (2A) and Fuse Socket
- 7805 5V Regulator
- Terminal Blocks (x8)
- PIC Programmer (Available)

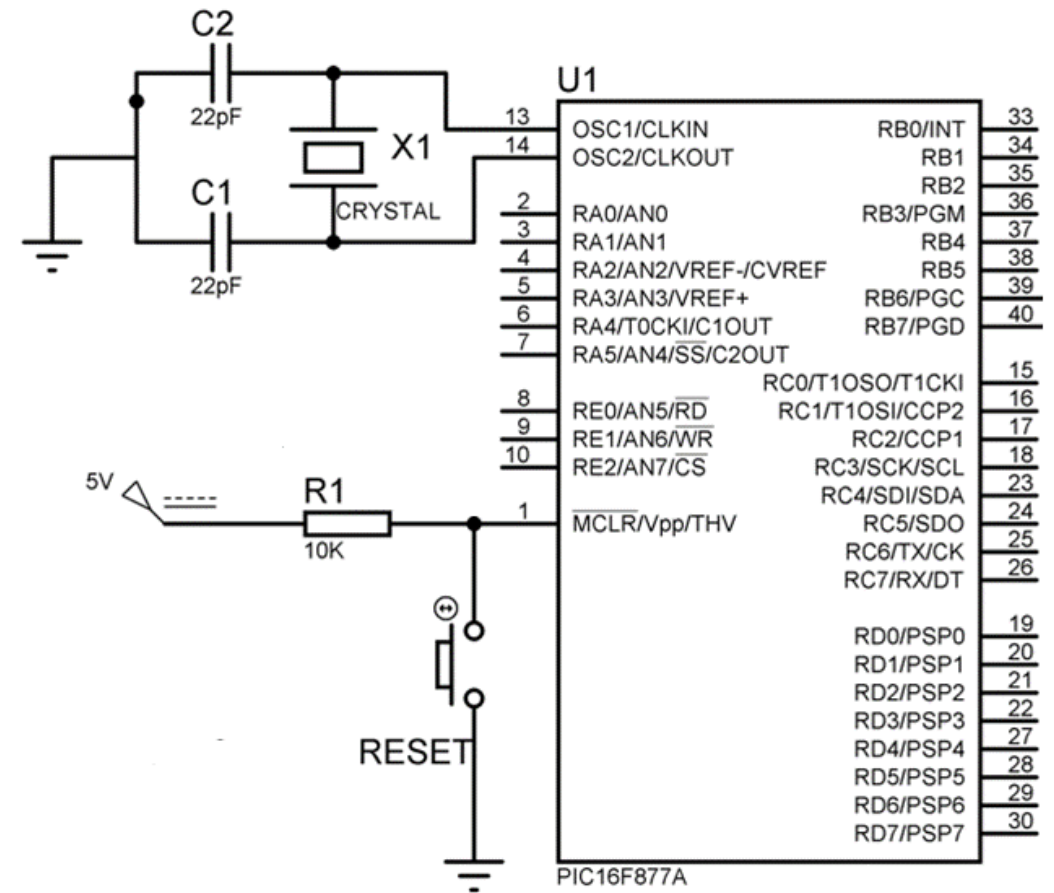
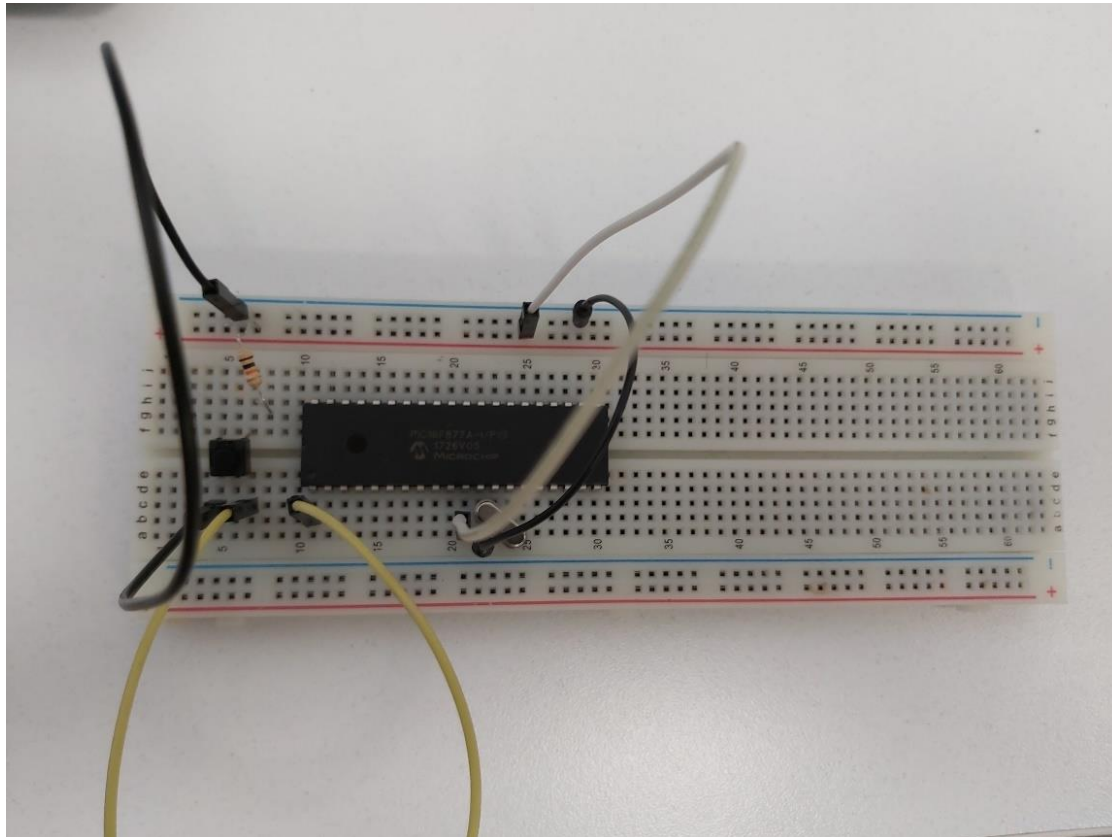


Connections

- Reset pin should be powered
- OSC1 & OSC2 should be connected to crystal and 22pF capacitors
- Programmer is connected to Reset, PGD & PGC pins.

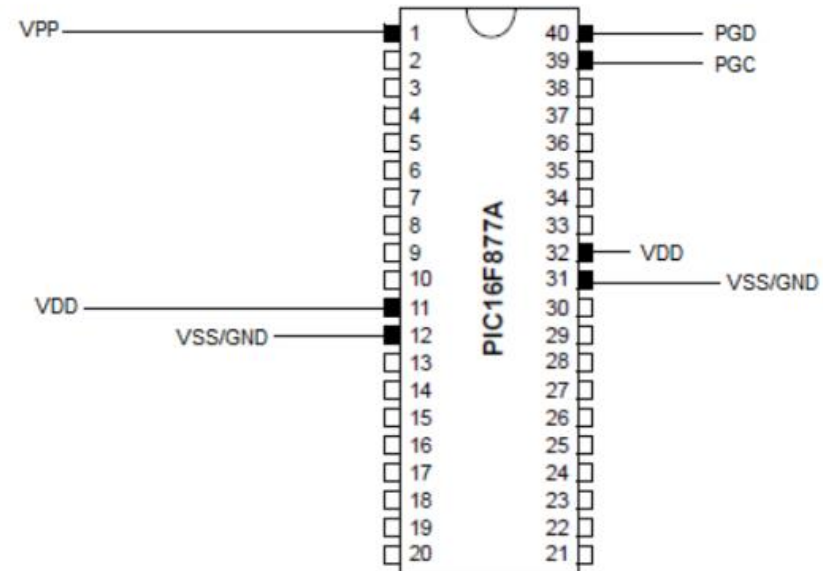
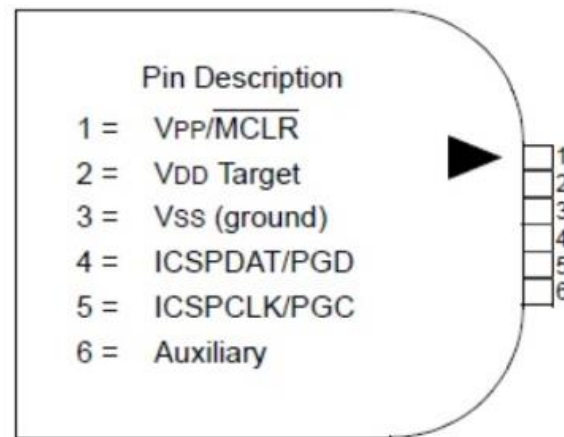
Hardware

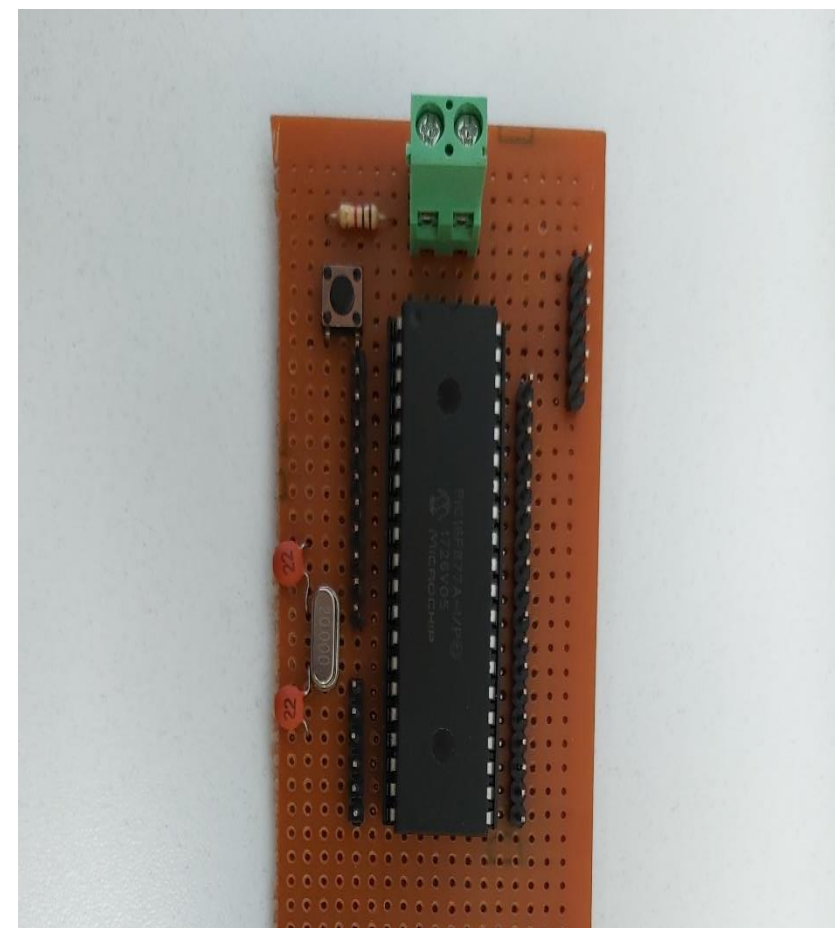
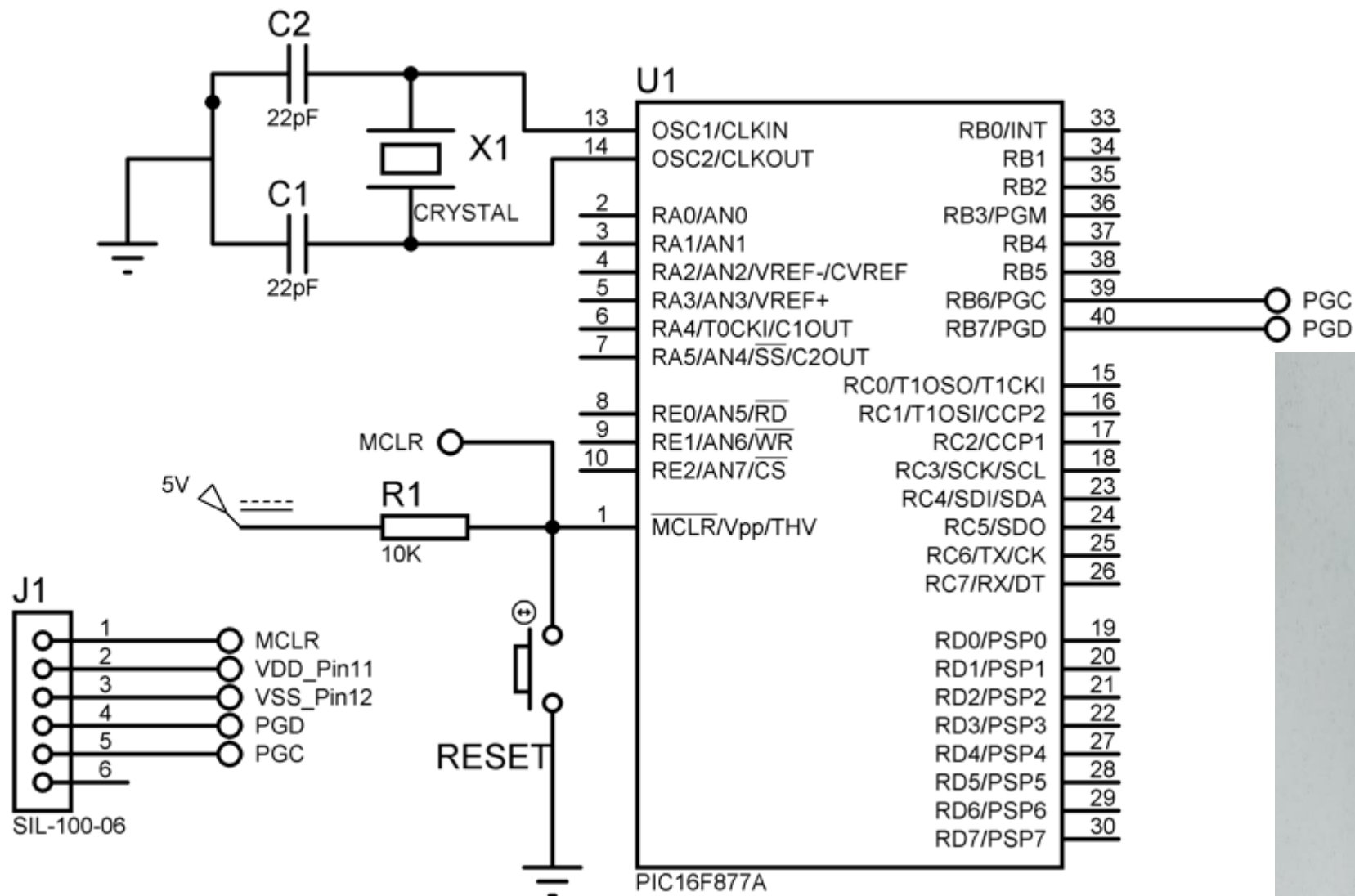
- Minimum connection for PIC16F877A

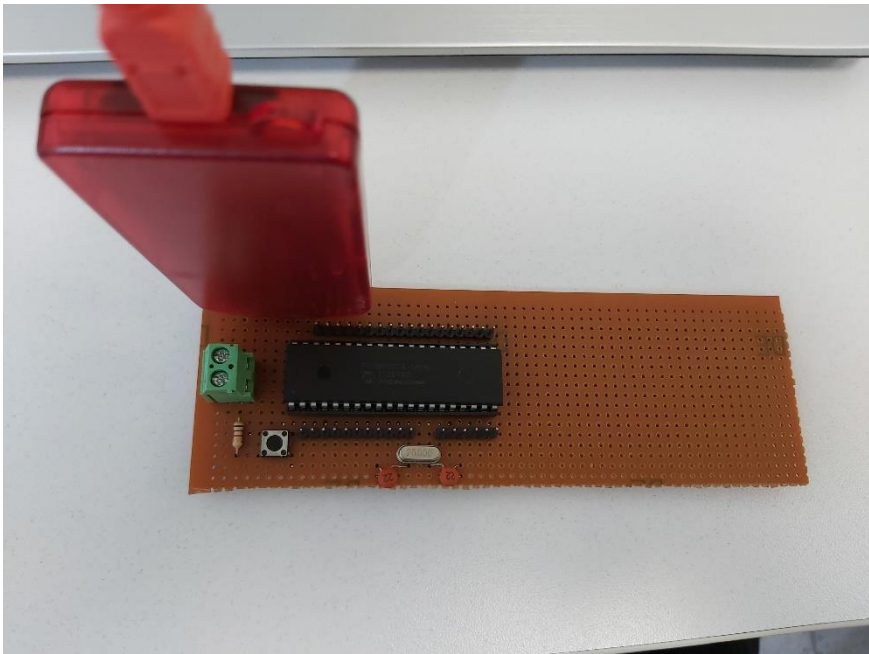
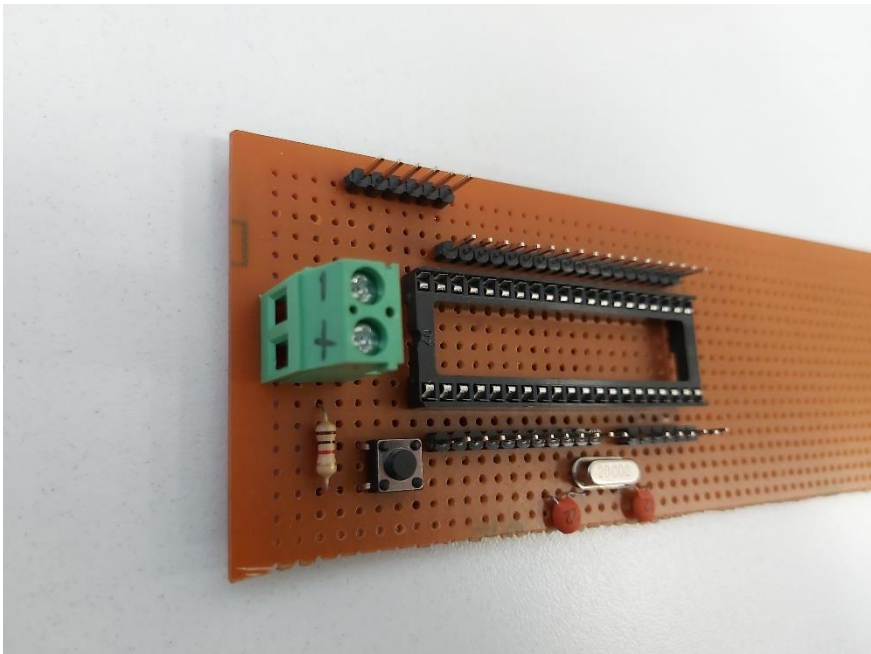
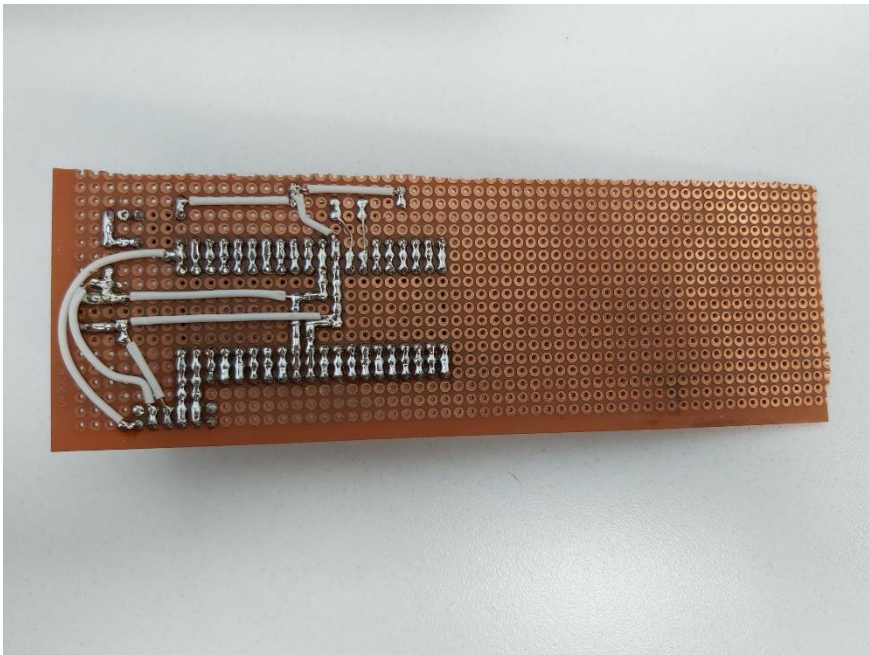
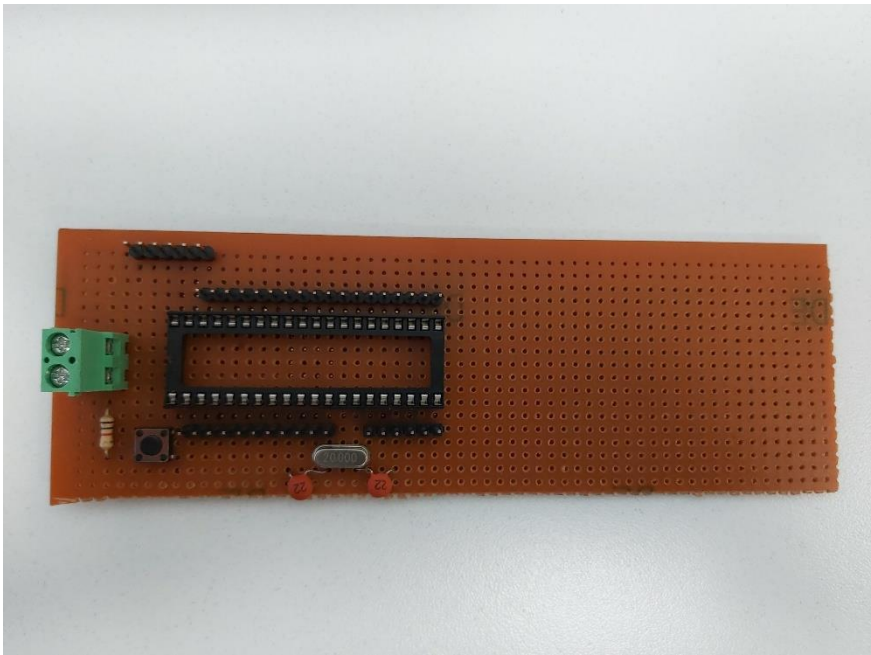


Proper PIC16F877A Custom Board

- Advantages;
 - Strong connections
 - Proper code uploading opportunity (less damage)
 - Customization possibility







Components and Software

Needed Software

- CCS C Compiler (Coding Environment and Converter to .hex)
- Proteus (Simulation Environment)
- PIC Programmer Software
 - MPLAB X IDE
 - PICkit™ 3 Programming App and Scripting Tool

CCS C Compiler

File Edit Search Options Compile View Tools Debug Document User Toolbar

Build Build & Run Compile Target FC12F1840 PCM 14 bit Program Debug Statistics C/ASM List Call Tree Symbols

main.c

```
1 #include <main.h>
2
3 signed int32 pwm;
4
5 void main()
6 {
7     setup_adc_ports(SAN3);
8     unsigned long int _readAnalog1;
9     setup_adc(adc_clock_div_32);
10    // PWM Define
11    setup_ccp1(CCP_PWM);
12    //setup_ccp2(CCP_OFF);
13    setup_timer_2(T2_DIV_BY_16, 255, 1);
14    pwm = 512;
15    set_pwm1_duty(pwm);
16    while(TRUE)
17    {
18        set_adc_channel(3);
19        _readAnalog1 = read_adc();
20        delay_ms(1);
21        /*if (_readAnalog1 > 1023)
```

22:30 Insert Pjt: main C:\Users\Mertcan\Documents\CCS C Projects\ElectronicProject\main.c

Memory usage: ROM=4% RAM=4% - 11%
0 Errors, 0 Warnings.
Build Successful.

Memory Use

RAM: 11%

ROM: 4%

Output Compiler Find

Operate

Device and Tool Selection

Family: All Families

Device: PIC16F877A

Tool: Select Tool

Apply

Connect

Results

Checksum: 0FCF

Pass Count: 354

Fail Count: 3

Total Count: 357

Program

Erase

Read

Verify

Blank Check

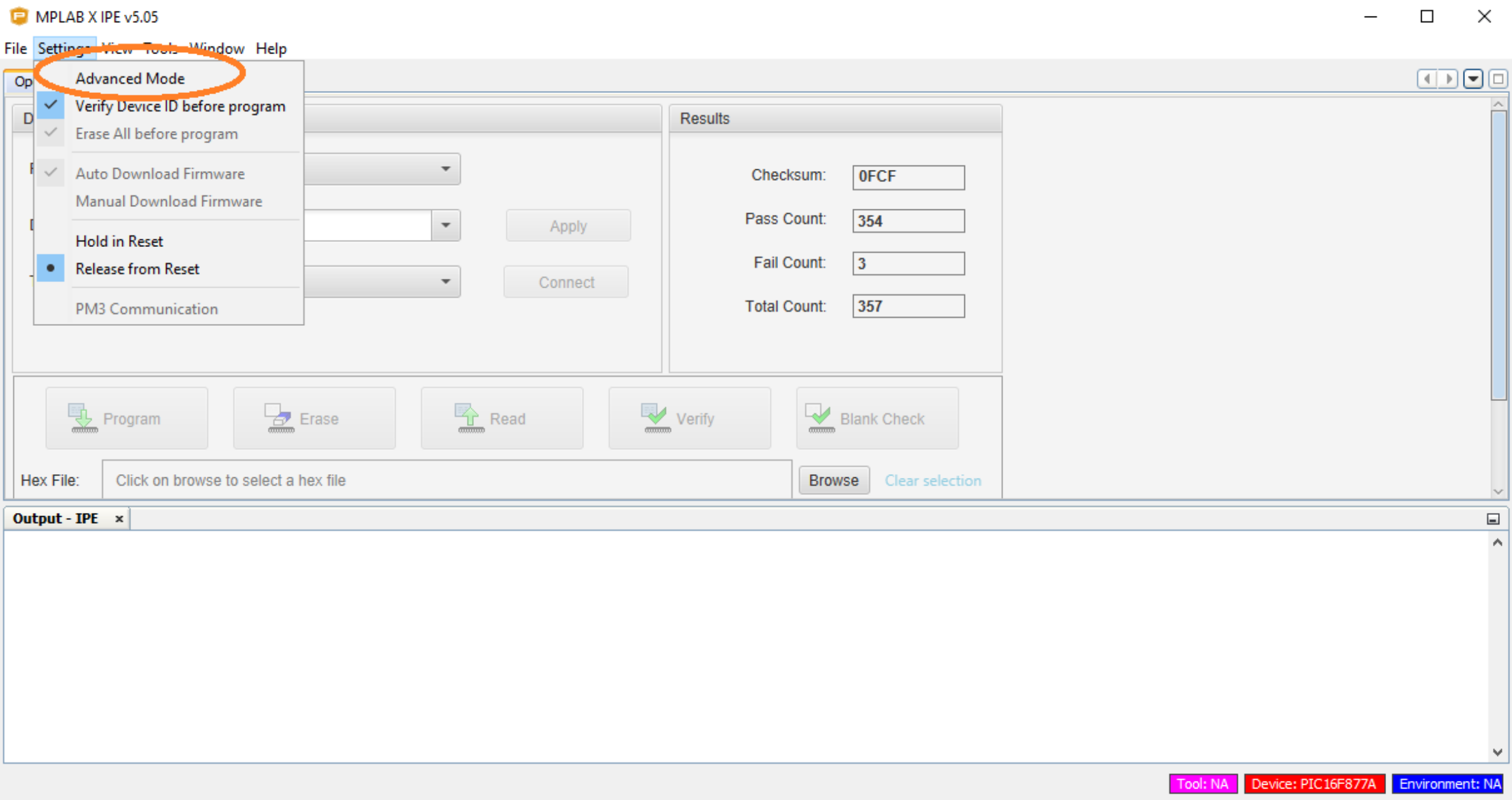
Hex File: Click on browse to select a hex file

Browse

Clear selection

Output - IPE ×

Tool: NA Device: PIC16F877A Environment: NA



Optio... Operate Power Settings x

Power Settings

VDD: 5.0

VPP: 13.0 N/A

VDD Nom: 5.0 N/A

VDD App: 5.0 N/A

Reset Voltages

ICSP Options

☐ Use Low Voltage Program mode entry ☒ Power Target circuit from Tool

Output - IPE x

Operate

Power

Memory

Environment

SQTP

Production

Settings


Logout

Optio... **Operate** **Power Settings** x

Operate
Power
Memory
Environment
SQTP
Production
Settings
Logout

Device and Tool Selection

Family: All Families

Device: PIC16F877A  **Apply**

Tool: PICKit3 S.No : BUR132284452 **Disconnect**

Results

CP=OFF Checksum: 7E59

Checksum: 7E59

Pass Count: 354

Fail Count: 3

Total Count: 357

Program **Erase** **Read** **Verify** **Blank Check**

Hex File: C:\Users\Mertcan\Documents\CCS C Projects\ElectronicProject\main.hex **Browse** [Clear selection](#)

SQTP File: Please click on Browse button to import SQTP file **Browse** [Clear selection](#)

Output - IPE x

```
*****  
  
Connecting to MPLAB PICKit 3...  
  
Currently loaded firmware on PICKit 3  
Firmware Suite Version.....01.54.00  
Firmware type.....Midrange  
Programmer to target power is enabled - VDD = 5,000000 volts.
```